Publicker Industries

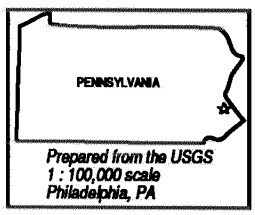
Philadelphia, Pennsylvania
Region 3
PAD981939200

Site Exposure Potential

Publicker Industries, a former alcohol distillery in southeast Philadelphia, Pennsylvania, covers 15 hectares in a highly industrialized area along the Delaware River adjacent to the Walt Whitman Bridge (Figure 1). Between 1912 and 1985, distilled alcohols were used in the on-site production of liquor, solvents, cleaners, antifreeze, and rubbing alcohol. The site was also used for storing petroleum products in the late 1970s and early 1980s before being abandoned in November 1986 (Tetra Tech 1990).

The site contains storage tanks and drums, reaction vessels, product stock, chemical laboratories, production buildings, and warehouses, and is criss-crossed with above- and below-ground process lines. Spills of unknown quantity and content occurred in the past. In addition, wastes have been improperly stored; leaking drums and process lines have been documented. Oil sheens coming from the site have been observed on the Delaware River (Tetra Tech 1990).

The site is built on construction rubble and backfill, including concrete, bricks, and railroad ties. A shallow, unconfined aquifer and a deep, confined aquifer occur beneath the site. The shallow



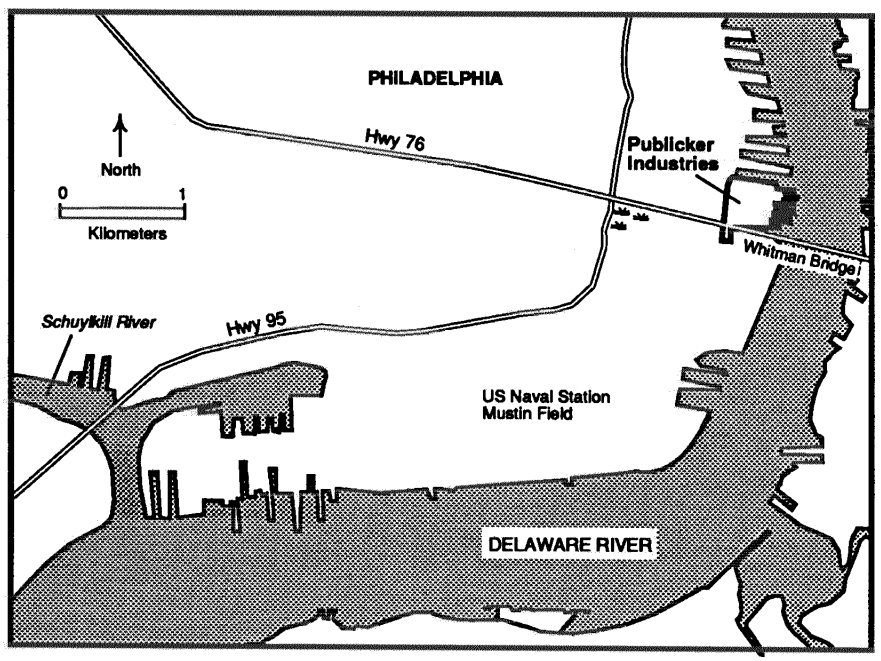


Figure 1. Publicker Industries, Philadelphia, Pennsylvania.

Publicker Industries

Site Exposure Potential, *cont.*

aquifer is recharged by surface infiltration and leakage from sewer and water lines. The recharge area for the deep aquifer is west of the Publicker site. Groundwater in the shallow aquifer flows radially to the north, south, and east from an area of high elevation near the center of the site.

Both surface water and groundwater discharge represent potential pathways of contamination from the site to NOAA resources and associated habitats. Contaminated sediments represent a secondary source of contamination for aquatic biota.

Site-Related Contamination

In 1986, Dames and Moore collected groundwater and soil samples as part of an environmental evaluation of the site. Results indicated the presence of several volatile and semi-volatile organic compounds and inorganic substances in these matrices at elevated concentrations. Most organic and inorganic compounds detected in soil exceeded background concentrations established for eastern U.S. soil. Toluene was present in groundwater at concentrations 10 times greater than ambient water quality criteria for the protection of freshwater or marine organisms (Dames and Moore 1986; EPA 1986).

In 1988, the Pennsylvania Department of Environmental Resources conducted additional, limited sampling of soil, groundwater, surface water, and sediment to evaluate risks to human health and the environment (Table 1; Tetra Tech 1990). Study results, similar to the 1986 Dames and Moore evaluation, confirmed the patchy distribution of contaminants at the Publicker site. The levels of toluene and lead in groundwater were very high. PAHs, PCBs (Aroclor 1254), and other organic compounds were detected in soil and sediment at concentrations exceeding background or low effect range values (ER-L) for these substances (Long and Morgan 1990). Soil and sediment values for copper, lead, mercury, and zinc greatly exceeded their screening values.

Site-Related Contamination, *cont.*

Table 1. Maximum concentrations of contaminants of concern at the Publicker site.

	Water			Soil		Sediment	
	Ground water	Surface Water	AWQC[1]	Soil	Average[2] U.S. Soil	Storm Drain Sediment	ER-L[3]
	µg/l	µg/l	µg/l	mg/kg	mg/kg	mg/kg	mg/kg
INORGANIC SUBSTANCES							
cadmium	ND	ND	1.1+	10.4	0.06	2.3	5
chromium	40	ND	11	176	100	60	80
copper	27	38	12+	3070	30	880	70
lead	45,000	205	3.2+	655	10	370	35
mercury	ND	ND	0.012	5.3	0.03	1.2	0.15
zinc	110	120	110+	691	50	390	120
ORGANIC COMPOUNDS							
toluene	120000	ND	a17500*	110	NA	350	NA
benzo(a) pyrene	ND	ND	NA	3500	NA	1400	0.4
naphthalene	ND	ND	620*	110	NA	230	0.34
anthracene	ND	ND	NA	350	NA	420	0.15
fluoranthene	ND	ND	a3,980*	1700	NA	2300	0.60
phenanthrene	ND	ND	NA	630	NA	1500	0.225
pyrene	ND	ND	NA	1500	NA	1800	0.35
benzo(a) anthracene	ND	ND	NA	1300	NA	1300	0.23
chrysene	ND	ND	NA	1600	NA	1500	0.40
PCBs	ND	ND	0.014	1800	NA	ND	0.05

1: Ambient water quality criteria for the protection of aquatic life, freshwater chronic criteria presented (EPA 1986).
2: Lindsay (1979).
3: Effective range-low; the concentration representing the lowest 10 percentile value for the data in which effects were observed or predicted in studies compiled by Long and Morgan (1990).
\+ Hardness-dependent criteria; 100 mg/l $CaCO_3$ used
* Insufficient data to develop criteria, value presented is the Lowest Observed Effects Level (LOEL)
a AWQC freshwater acute criteria, no chronic criteria available (EPA 1986).
NA Comparison value not available
ND Not detected at method detection limit

NOAA Trust Habitats and Species

The Delaware River near the site provides seasonal habitat for several anadromous, catadromous, and estuarine species (Table 2; Delaware River Basin Commission 1988; Kauffman personal communication 1989). An endangered species, the shortnose sturgeon, forages in the region during its juvenile years and migrates through the area to its upstream spawning grounds.

Species of special interest to NOAA because of their commercial importance or abundance in the area include striped bass, American shad, alewife, herring, anchovy, white perch, Atlantic and shortnose sturgeon, American eel, and blue crab. American shad, alewife, herring, and striped bass are commercially fished on the Atlantic coast and are currently managed by the National Marine Fisheries Service. There are also local sport fisheries for several of these species, although an advisory is in effect for human consumption of white perch, blue crab, and channel catfish in this

NOAA Trust Habitats and Species, *cont.*

section of the river due to high levels of PCBs (Delaware River Basin Commission 1988; Kauffman personal communication 1989).

Table 2. Habitat and species use in the Delaware River near the site.

Species		Habitat		
Common Name	Scientific Name	Spawning	Nursery	Adult Forage
ANADROMOUS/CATADROMOUS				
shortnose sturgeon	*Acipenser brevirostrum*		◆	◆
Atlantic sturgeon	*Acipenser oxyrhynchus*		◆	◆
blueback herring	*Alosa aestivalis*		◆	◆
alewife	*Alosa pseudoharengus*		◆	◆
American shad	*Alosa sapidissima*		◆	◆
bay anchovy	*Anchoa mitchilli*		◆	◆
American eel	*Anguilla rostrata*		◆	
gizzard shad	*Dorosoma cepedianum*			◆
striped bass	*Morone saxatilis*		◆	◆
ESTUARINE				
blue crab	*Callinectes sapidus*		◆	◆
white perch	*Morone americana*	◆	◆	◆
striped killifish	*Fundulus majalis*	◆	◆	◆

References

Dames and Moore. 1986. Preliminary Environmental Evaluation Report. Former Publicker Industries Refinery. Fairfax, Virginia: Tetra Tech, Inc.

Delaware River Basin Commission. 1988. Fish Health and Contamination Study. West Trenton, New Jersey: Pennsylvania Coastal Zone Management Program, Delaware Estuary Use Attainability Project. DEL USA Project Element 10.

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Long, E.R. and L.G. Morgan. 1990. The potential for biological effects of sediment-sorbed contaminants tested in the National Status and Trends Program. Seattle: Coastal and Estuarine Assessment Branch, NOAA. NOAA Technical Memorandum NOS OMA-52. 175 pp.+ Appendices.

Publicker Industries

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